Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A bipolar plate for a fuel cell stack comprising:

a ~~semi-conductive~~ body formed from a doped semi-conductive material having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face ~~comprising~~ including a first flow channel adapted to confine fuel fluids, and the second face ~~comprising~~ including a second flow channel adapted to confine oxidizing fluids.

2. (Original) The bipolar plate as defined in claim 1 wherein the bipolar plate has a thickness ranging from about 50 microns to about 2,000 microns.

3. (Original) The bipolar plate as defined in claim 1 wherein the bipolar plate has a thickness ranging from about 500 microns to about 1,000 microns.

4. (Original) The bipolar plate as defined in claim 1 wherein at least one of the flow channels has a width ranging from about 1 micron to about 5,000 microns.

5. (Original) The bipolar plate as defined in claim 1 wherein at least one of the flow channels has a width ranging from about 20 microns to about 500 microns.

6. (Currently Amended) ~~The~~ A bipolar plate ~~as defined in claim 1~~ for a fuel cell stack comprising:

a semi-conductive body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face comprising a first flow channel adapted to confine fuel fluids, and the second face comprising a second flow channel adapted to confine oxidizing fluids;

wherein at least one of the flow channels has a depth ranging from about 1 micron to about 3,000 microns.

7. (Currently Amended) ~~The~~ A bipolar plate ~~as defined in claim 1~~ for a fuel cell stack comprising:

a semi-conductive body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face comprising a first flow channel adapted to confine fuel fluids, and the second face comprising a second flow channel adapted to confine oxidizing fluids;

wherein at least one of the flow channels has a depth ranging from about 5 microns to about 500 microns.

8. (Currently Amended) ~~1~~ The bipolar plate as defined in claim 1 wherein the semi-conductive ~~body~~ material is selected from the group consisting of the Group IV semiconductors, the Group III-V semiconductors, and the Group II-VI semiconductors.

9. (Canceled)

10. (Currently Amended) The bipolar plate as defined in claim 1 wherein the semi-conductive ~~body~~ material is silicon.

11. (Original) The bipolar plate as defined in claim 1 wherein the first flow channel is further coated with a reforming catalyst or catalytic combuster.

12. (Original) The bipolar plate as defined in claim 11 wherein the reforming catalyst is selected from the group consisting of platinum, ruthenium, rhodium, nickel, cerium, iron, chromium, cobalt, manganese, copper, aluminum, oxides thereof, and mixtures thereof.

13. (Currently Amended) ~~The~~ A bipolar plate ~~as defined in claim 1, the bipolar plate further~~ for a fuel cell stack comprising:

a semi-conductive body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face comprising a first flow channel adapted to confine fuel fluids, and the second face comprising a second flow channel adapted to confine oxidizing fluids; and

a conduit therethrough.

14. (Original) The bipolar plate as defined in claim 13 wherein the conduit is adapted to receive a cooling fluid or a heating fluid.

15. (Original) The bipolar plate as defined in claim 14, the bipolar plate further comprising a recuperative heat exchanger.

16. (Original) The bipolar plate as defined in claim 13 wherein the conduit is further coated with a reforming catalyst or catalytic combuster.

17. (Currently Amended) ~~The~~ A bipolar plate ~~as defined in claim 1, the bipolar plate further~~ for a fuel cell stack comprising:

a semi-conductive body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face comprising a first flow channel adapted to confine fuel fluids, and the second face comprising a second flow channel adapted to confine oxidizing fluids; and

a resistive element located within the bulk of the bipolar plate or on the surface of the bipolar plate and adapted to heat the bipolar plate.

18. (Original) The bipolar plate as defined in claim 17 wherein the resistive element is selected from the group consisting of thin film resistive elements, thick film resistive elements, and diffused resistors.

19. (Original) The bipolar plate as defined in claim 17 wherein the resistive element comprises a material selected from the group consisting of doped silicon, nickel, chromium, tantalum, aluminum, molybdenum, tungsten, titanium, palladium, platinum, silicides thereof, oxides thereof, and mixtures thereof.

20. (Currently Amended) ~~The~~ A bipolar plate ~~as defined in claim 1, the bipolar plate further~~ for a fuel cell stack comprising:

a semi-conductive body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face comprising a first flow channel adapted to confine fuel fluids, and the second face comprising a second flow channel adapted to confine oxidizing fluids; and

a sensor located within the bulk of the bipolar plate or on the surface of the bipolar plate.

21. (Original) The bipolar plate as defined in claim 20, wherein the sensor is selected from the group consisting of mechanical, thermal, magnetic, electrical, chemical, and radiation sensors.

22. (Original) The bipolar plate as defined in claim 20 wherein the sensor is selected from the group consisting of pressure, temperature, voltage, and flow sensors.

23. (Original) The bipolar plate as defined in claim 21 wherein the chemical sensor is selected from the group consisting of hydrogen ion, hydrogen, oxygen, water, hydrogen peroxide, carbon monoxide, carbon dioxide, sulfur, sulfur oxide, methanol, ethanol, methane, ethane, butane, propane, and pentane sensors.

24. (Original) A bipolar plate for a fuel cell stack comprising:

a conductive body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face comprising a first flow channel adapted to confine fuel fluids, the second face comprising a second flow channel adapted to confine oxidizing fluids; and

a sensor located within the bulk of the bipolar plate or on the surface of the bipolar plate.

25. (Original) The bipolar plate as defined in claim 24 wherein the conductive body is selected from the group consisting of graphite, stainless steel, nickel, iron, chrome, tungsten, cobalt, titanium, and alloys thereof.

26. (Original) The bipolar plate as defined in claim 24 wherein the first flow channel is further coated with a reforming catalyst.

27. (Original) The bipolar plate as defined in claim 24, the bipolar plate further comprising a conduit therethrough.

28. (Original) The bipolar plate as defined in claim 27 wherein the conduit is adapted to receive a cooling fluid or a heating fluid.

29. (Original) The bipolar plate as defined in claim 27 wherein the conduit is further coated with a reforming catalyst or catalytic combuster.

30. (Original) The bipolar plate as defined in claim 24, the bipolar plate further comprising a resistive element located within the bulk of the bipolar plate or on the surface of the bipolar plate and adapted to heat the bipolar plate.

31. (Original) A bipolar plate for a fuel cell stack comprising:

a conductive body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face comprising a first flow channel adapted to confine fuel fluids, the second face comprising a second flow channel adapted to confine oxidizing fluids, wherein the first flow channel is further coated with a reforming catalyst.

32. (Original) A bipolar plate for a fuel cell stack comprising:

a conductive body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face comprising a first flow channel adapted to confine fuel fluids, the second face comprising a second flow channel adapted to confine oxidizing fluids; and

a conduit therethrough adapted to receive cooling or heating fluid.

33. (Original) A bipolar plate for a fuel cell stack comprising:

a conductive body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face comprising a first flow channel adapted to confine fuel fluids, the second face comprising a second flow channel adapted to confine oxidizing fluids; and

a conduit therethrough coated with a reforming catalyst.

34. (Original) A bipolar plate for a fuel cell stack comprising:

a conductive body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face comprising a first flow channel adapted to confine fuel fluids, the second face comprising a second flow channel adapted to confine oxidizing fluids; and

a resistive element located within the bulk of the bipolar plate or on the surface of the bipolar plate and adapted to heat the bipolar plate

35-49. (Canceled)

50. (Original) An end plate for a fuel cell stack comprising:

a semi-conductive body having a first face adapted to collect current and a second face adapted to contact an electrode of the fuel cell, the first face having a substantially planar surface, and the second face comprising an etched flow channel adapted to confine fluids.

51. (Original) The end plate of claim 50, the end plate further comprising a sensor located within the bulk of the end plate or on the surface of the end plate.

52. (Original) The end plate of claim 50, the end plate further comprising a resistive element located within the bulk of the end plate or on the surface of the end plate and adapted to heat the end plate.

53. (Original) An end plate for a fuel cell stack comprising:

a conductive body having a first face adapted to collect current and a second face adapted to contact an electrode of the fuel cell, the first face having a substantially planar surface, and the second face comprising an etched flow channel adapted to confine fluids; and

a sensor located within the bulk of the end plate or on the surface of the end plate.

54. (Original) The end plate of claim 53, the end plate further comprising a resistive element located within the bulk of the end plate or on the surface of the end plate and adapted to heat the end plate.

55. (Canceled)

56. (Currently Amended) A fuel cell stack comprising:

a plurality of fuel cells, each fuel cell comprising a cathode, an anode, and an electrolyte arranged between the cathode and anode;

bipolar plates arranged between the fuel cells, each bipolar plate ~~comprising~~ including a ~~semi-conductive~~ body formed from a doped semi-conductive material having a first face adapted to contact the anode of a fuel cell and a second face adapted to contact the cathode of a fuel cell, the first face ~~comprising~~ including a first flow channel adapted to confine fuel fluids, and the second face ~~comprising~~ including a second flow channel adapted to confine oxidizing fluids; and

end plates, each end plate comprising a semi-conductive or conductive body having a first face adapted to collect current and a second face adapted to contact an electrode of a fuel cell, the first face having a substantially planar surface, and the second face comprising a flow channel adapted to confine fluids.

57. (Canceled)

58. (Original) An electronic device comprising a fuel cell stack according to claim 56.

59. (New) A bipolar plate for a fuel cell stack comprising:

a body formed from an undoped semi-conductive material with relatively high electrical conductivity at low temperatures, the body having a first face adapted to contact an anode of a first fuel cell and a second face adapted to contact a cathode of a second fuel cell, the first face including a first flow channel adapted to confine fuel fluids, and the second face including a second flow channel adapted to confine oxidizing fluids.

60. (New) The bipolar plate as defined in claim 59 wherein the bipolar plate has a thickness ranging from about 50 microns to about 2,000 microns.

61. (New) The bipolar plate as defined in claim 59 wherein at least one of the flow channels has a width ranging from about 1 micron to about 5,000 microns.

62. (New) The bipolar plate as defined in claim 59 wherein the semi-conductive material is selected from the group consisting of the Group IV semiconductors, the Group III-V semiconductors, and the Group II-VI semiconductors.

63. (New) The bipolar plate as defined in claim 59 wherein the semi-conductive material is silicon.

64. (New) The bipolar plate as defined in claim 59 wherein the first flow channel is further coated with a reforming catalyst or catalytic combuster.